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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
BAUSCH, SARAE L	
ART UNIT	PAPER NUMBER
1634	

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/073,260	SIMMS ET AL.	
	Examiner	Art Unit	
	Sarae Bausch	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31 and 55-65* is/are pending in the application.

4a) Of the above claim(s) *32-54,64 and 65* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31 and 55-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 February 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/02, 09/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I (claims 1-31 and 55-63) in the response filed June 14, 2004, is acknowledged. The response provides no arguments with the traversal. For reasons made record in the previous office action, the restriction requirement is deemed proper and therefore made final.

2. Claims 32-54 and 64-65 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected group, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on June 14, 2004.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-31 and 55-63 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a). Claims 1, 31 and 55 are rejected as vague and indefinite as it is not clear if the recitation "wherein the pore size of said filter increases in the direction of sample flow" means that the filter itself has an increasing pore size or that a first filter in relation to a second filter increases in pore size in relation to the sample flow.

(b). Claim 13 recites the limitation "the second filter". There is insufficient antecedent basis for this limitation in the claim. Claim 13 is a dependent claim of claim 12, claim 12 recites a filter layer and second filter layer. There is no recitation of a second filter therefore it is unclear if there is one filter with two layers or one filter with two layers and a second filter.

(c). Claim 15 is vague and indefinite over the recitation of "pores of sufficient size to shear genomic DNA". It is unclear what pore size is "sufficient" to shear genomic DNA. The term "sufficient" renders the claim indefinite.

(d). Claim 27 is vague and indefinite over the recitation "said first filter layer is comprised of regenerated cellulose, with a pore size of about .2 μm, and comprised of polyethylene or polypropylene, with an average pore size of about 20 μm". It is unclear if the first filter layer comprises two separate filters with two different compositions and pore sizes or, in the alternative, if the first filter layer consists of regenerated cellulose fused with polyethylene or polypropylene and encompasses two different pore sizes throughout the filter.

(e). Regarding claim 29, the phrase "and the like" renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "and the like"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05

(f). Regarding claim 62, the phrase "e.g." renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

(g). Claim 62 recites the limitation "said filter layers". There is insufficient antecedent basis for this limitation in the claim.

Claim Interpretation

The recitation "wherein the pore size of said filter increases in the direction of sample flow" in claims 1, 31 and 55 are unclear (see 112, second paragraph rejection above). The claims have been given their broadest reasonable interpretation to encompass a first filter that has a decreased pore size in relation to the second filter, and that the pore size increases in the direction of sample flow.

The recitation "frit" is not defined in the specification or claims. It has been given the broadest reasonable interpretation to be any porous filter material that retains fine particles.

The recitation "said first filter layer is comprised of regenerated cellulose, with a pore size of about .2 μm, and comprised of polyethylene or polypropylene, with an average pore size of about 20 μm" is vague and indefinite. Therefore, the claims have been broadly interpreted to encompass a filter that contains two filters that have a regenerated cellulose layer of about .2 μm and a second filter layer that comprises polyethylene with a pore size of about 20 μm.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-18, 21-23, 25, 28-31, 55-59, and 61-63 are rejected under 35 U.S.C. 102(b) as being anticipated by Jones (PCT WO95/02049). Jones teaches a method of separating biological compounds from cells by filtration using two filters with increasing pore size in the direction of sample flow.

With regard to claim 1, Jones (WO95/02049) teaches a method of purifying plasmid DNA (biological macromolecule) from *E. coli* bacterial culture (biological sample) by passing the cells through a 1 μm filter followed by a 20μm filter (page 22, 1st full paragraph).

With regard to claim 2, Jones teaches the method of purifying nucleic acid from cells that comprises lysing a cell suspension to form a cell lysate containing nucleic acid and applying the cell lysate to a filter to remove unwanted cells and cell debris (page 2, 4th full paragraph).

With regard to claims 3-5, Jones teaches that any cell producing a target compound may be used in their invention. Jones defines a "cell" to encompass bacterial cells, cells from higher organisms for example blood cells, phage particles, and other cell types or organelles which contain the target compound and may require some form of lysis step to release it (page 3, 4th full paragraph). The cells are lysed prior to applying to the first filter (page 2, 4th full paragraph).

With regard to claims 6-11, Jones teaches that the target compound to be separated may comprise nucleic acid (instant claim 6), protein, or other desired compounds, in particular purifying recombinant proteins and antibodies (instant claim 7)(page 2, 2nd and 3rd paragraph). Jones further teaches that RNA or DNA may be purified using this invention (page 5, 2nd paragraph) (instant claim 8-11).

With regard to claims 12-18, Jones teaches the use of two filter layers to purify DNA from bacterial cells, with the first filter layer having 1μm pore size (instant claims 12-14) and the second filter layer having 20 μm pore size (instant claims 15-18) (page 22, 1st full paragraph).

With regard to claims 21-23 and 25, Jones teaches the use of a first filter layer that retains unwanted cells and cell debris (instant claim 21), that is made of any material that can tolerate the reagents such as cellulose acetate (acetylated cellulose) (instant claim 25) and is no greater than 50 μm in pore size and no smaller than .2 μm (instant claim 22-23) (page 6, 1st full paragraph).

With regard to claim 28 and 29, Jones teaches the method of a membrane filter that is placed inside the column (tube) (instant claim 29) and has a cylindrical shape (instant claim 28) (page 11, last paragraph, figure 1 and figure 2).

With regard to claims 30-31, Jones teaches the method of lysing a cell suspension to form a cell lysate, applying the cell lysate to a filter to remove unwanted cells and cell debris, contacting the filtered lysate with a solid phase matrix, separating the resultant filtered lysate from the matrix, and eluting the nucleic acid from the matrix (page 2, 4th full paragraph). Jones teaches the method of purifying plasmid DNA by using a filtration method of increasing pore sizes of two filters using a 1 μm filter followed by a 20 μm filter and promoting the flow of lysate through the filters by positive pressure (page 22, 1st full paragraph).

With regard to claim 55-59 and 61-62, Jones teaches the method of lysing a cell suspension from *E. coli* (natural source) to form a cell lysate, applying the cell lysate to a filter to remove unwanted cells and cell debris, followed by contacting the filtered lysate with a solid phase matrix, separating the resultant filtered lysate from the matrix, and eluting the nucleic acid

from the matrix (page 2, 4th full paragraph). Jones teaches the method of purifying plasmid DNA (instant claim 57) by the method of increasing the pore sizes of the filters (instant claim 55 and 59), by using a 1 μm cellulose acetate filter followed by a 20 μm PTFE filter (instant claim 61-62) and promoting the flow of lysate through the filters by positive pressure (instant claim 56) (page 22, 1st full paragraph and Table 1, page 21).

With regard to claim 63, Jones teaches an assembly of multiple columns that can process multiple samples simultaneously (figure 3 and page 14, 2nd full paragraph).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 19 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (WO95/02049) in view of Dewitt (US Patent 6183645)

Jones (WO95/02049) teaches the method of lysing a cell suspension to form a cell lysate, applying the cell lysate to a filter to remove unwanted cells and cell debris, followed by contacting the filtered lysate with a solid phase matrix, separating the resultant filtered lysate from the matrix, and eluting the nucleic acid from the matrix (page 2, 4th full paragraph). Jones teaches the method of purifying plasmid DNA by increasing the pore sizes of two filters or two filter layers, having a first cellulose acetate filter layer followed by a second PTFE filter, which can be considered a "frit" (page 22, 1st full paragraph and Table 1, page 21). Jones does not teach the use of the second filter layer which is polypropylene (claim 24) and is composed of two frits (claim 19).

DeWitt ('645) teaches the method of phase separation using one or more polypropylene frits (column 3, lines 46-50) and teaches the use of the improved apparatus for purification and isolation (column 1, lines 50-64).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to improve in the method of Jones to substitute in the second filter layer of Jones, two polypropylene frits as taught by Dewitt, to improve the method of Jones by providing a system that is more amenable to automation, facilitates more efficient and faster simultaneous purification and isolation, and is less expensive and easier to manufacture as taught by DeWitt (column 1, lines 55-64). The ordinary artisan would have been motivated to improve the method of Jones with the use of two frits in the second filter layer as taught by DeWitt, for the purpose of improving the method of Jones so as to include a second frit within the second

filter layer to insure better separation or isolation of the biological macromolecule. The ordinary artisan would have had a reasonable expectation of success that using a second frit in the method of Jones would yield improved and faster separation because DeWitt teaches that the use of two or more frits insures better results and faster purification, separation, and isolation techniques.

10. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (WO95/02049) as applied to claim 19 and 24 above, and further in view of Fung et al (US Patent 6221655).

The method of Jones in view of view of Dewitt (US Patent 6183645) is set forth in section 9 above. Jones in view of DeWitt does not teach the thickness of the two filter frits in the second filter layer.

Fung et al ('655) teaches the use of a filter frit made of porous low protein binding material such as polyethylene or polypropylene (see column 4, lines 64-66) with a thickness of .03-.04 in. (.16 mm) (see column 5, lines 11-19) in a spin filter assembly to facilitate the isolation of compounds, such as proteins, present in various biological samples (see column 6, lines 64-66). Furthermore, Fung et al. teaches the addition of a solid binding matrix to the spin frit filter assembly unit (see column 6, lines 65- 67 and column 7, lines 1-5). The thickness of "about" 1/16 of an inch is broadly interpreted to encompass 0.03-0.04 inches (0.16 mm).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use a filter frit of about 0.16 mm thickness as disclosed by Fung et al. in the second filter layer (two frits) of Jones in view of DeWitt. While Jones in view of DeWitt does not disclose the thickness of each frit, Fung et al. teaches that the thickness of a polyethylene frit is, for example, 0.03-0.04 in (0.16 mm). The ordinary artisan would have been

motivated to include a frit with a thickness of 0.16 mm, as Fung et al. teaches that polyethylene or polypropylene frits used in isolation of biological macromolecules is about 0.03-0.04 inches. The instant claimed recitation of a frit of about 1/16 of an inch is obvious over the disclosure of Jones in view of DeWitt and further in view of Fung et al, absent secondary considerations.

11. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (WO95/02049) in view of Sirkar (US Patent 5053132)

Jones (WO95/02049) teaches the method of lysing a cell suspension to form a cell lysate, applying the cell lysate to a filter to remove unwanted cells and cell debris, followed by contacting the filtered lysate with a solid phase matrix, separating the resultant filtered lysate from the matrix, and eluting the nucleic acid from the matrix (page 2, 4th full paragraph). Jones teaches the method of purifying plasmid DNA by said method using increasing pore sizes of two filters, having a first cellulose acetate filter with a pore size of .2 μm followed by a second PTFE filter with a pore size of 20 μm (page 22, 1st full paragraph and Table 1, page 21). Jones does not teach the use of regenerated cellulose.

Sirkar ('132) teaches the use of a regenerated cellulose and polyethylene composite filter (see column 3, lines 62-68 and column 4, lines 1-9). Sirkar teaches the use of regenerated cellulose for use as a membrane for its enhanced solvent resistance properties over cellulose acetate membrane (column 4, lines 26-27) and the ability of the regenerated cellulose membrane to bind cellular debris and other biological materials (column 8, lines 3-13).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to improve the method of Jones, by modifying the first filter containing cellulose acetate of Jones to include a regenerated cellulose membrane as taught by

Sirkar, and the second filter composed of PTFE of Jones to include a support layer of polyethylene as taught by Sirkar, to improve the method of Jones to allow for better separation using a membrane that binds cellular debris, as taught by Sirkar. The ordinary artisan would have been motivated to improve the first filter layer of cellulose acetate in the filter assembly of Jones to include a regenerated cellulose membrane and the second filter layer of PTFE to a polyethylene membrane method taught by Sirkar for the purpose of improving the separation of the cell lysate to include a membrane that binds cellular debris and other unwanted biological compounds. The ordinary artisan would have had a reasonable expectation of success that using a porous hydrophilic regenerated cellulose membrane with a porous layer of polyethylene could be used to modify the filter assembly method of Jones because Sirkar teaches the use of regenerated cellulose membrane with a porous support of polyethylene prevent cellular debris from contaminating the final sample by immobilizing the cellular debris on a porous hydrophilic side of the membrane (column 8, lines 3-7).

12. Claims 24 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Fung et al (US Patent 6221655).

Jones teaches the method of lysing a cell suspension to form a cell lysate, applying the cell lysate to a filter to remove unwanted cells and cell debris, followed by contacting the filtered lysate with a solid phase matrix, separating the resultant filtered lysate from the matrix, and eluting the nucleic acid from the matrix (page 2, 4th full paragraph). Jones teaches the method of purifying plasmid DNA by said method using increasing pore sizes of two filters, having a cellulose acetate filter with the pore size of 1 μm followed by a PTFE filter with the pore size of 20μm (page 22, 1st full paragraph and Table 1, page 21). Jones does not teach the thickness of

the filter bed (claim 60), nor the use of a polyethylene frit for a second filter or filter layer (claim 24). The term "filter bed" is not defined by the specification. The term has therefore been given its broadest reasonable interpretation to encompass either the lower filter of a multiple filter assembly, or the entire thickness of a filter assembly comprising more than one filter, wherein the filters are stacked, in contact, each on top of the next.

Fung et al ('655) teaches the use of a filter frit as a second filter layer made of porous low protein binding material such as polyethylene or polypropylene with a thickness of .03-.04 inches (0.16 mm) (column 5, lines 11-19) in a spin filter assembly (binding matrix can be added as a first layer) to facilitate the isolation and analysis of biological macromolecules present in various biological samples (column 6, lines 64-66).

Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to use a filter bed of about 0.16 mm thickness as disclosed by Fung et al. in the second filter layer of Jones. While Jones does not disclose the thickness of the filter bed, Fung et al. teach that the thickness of a polyethylene frit is for example, .03-.04 inches (0.16 mm). The ordinary artisan would have been motivated to include a filter bed thickness of 0.16 mm, as Fung et al. teach that polyethylene or polypropylene frits used in isolation of biological macromolecules is about .03-.04 inches (0.16 mm). The instant claimed recitation of a filter bed of thickness being from 0.1 mm to 10 mm is obvious over the disclosure of Jones in view of Fung et al., absent secondary considerations.

Conclusion

No claims are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarae Bausch whose telephone number is (571) 272-2912. The examiner can normally be reached on M-F 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

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Jehanne Sitton

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PRIMARY EXAMINER
7/21/04

Sarae Bausch, PhD
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